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II. COMMENT ON CURRENT EDUCATIONAL WRITINGS

A. AN IMPORTANT BOOK ON THE TEACHING OF HIGH-SCHOOL SCIENCE

The traditional organization of a textbook on the teaching of a subject of study generally includes a formal discussion of the historical development of the subject in question; the values and place of the subject in the curriculum; a conventional classification of the subject-matter; and an orthodox presentation of accepted methods of the teaching (for example, inductive, deductive, etc.). The latter are ordinarily described in such general terms that no one but the most experienced teacher can translate the general laws and principles (which have been taken bodily from abstract treatises on psychology) into concrete classroom instruction. A second method involves the mastery, on the part of the author, of established principles of psychology concerning the mental processes involved in the learning of the subject in question. It involves, also, making a very definite and clearly expressed application of these principles to the specific problems of teaching the subject. In the past neither our courses in educational psychology nor special methods of teaching the different subjects have done this. It is with a feeling that we are entering at last on an intelligent use of the best results of psychological analysis of the learning process that we review Professor Twiss's new book *Principles of Science Teaching*.[1] The book is "aimed right" because it is built on an analysis of "thinking" as concerns scientific material and is not primarily a book which emphasizes the content of scientific subject-matter itself. The author is evidently vitally interested in the mental activity that children exhibit in studying scientific subjects rather than in an adult logical presentation of the subject-matter based on an academic point of view. The author's experience in school work confirms this conclusion, he himself having been a science teacher, author of textbooks and laboratory manuals in physics, and more recently a professor of education. For example, chapter iii, entitled "The Genesis of Science," is a very good elementary discussion of the development of modes of thinking in which are contrasted elementary, empirical, and animal types of learning with adult, human, constructive ways of thinking. The stress that he lays upon the learning process in connection with instruction in science is an outstanding characteristic of the first half of his book. Again, in chapter iv the mental processes of children as the crux of the teaching problem and their study in relation to the problems of science are taken up step by step. The book is significant in that it carries over to the teacher clearly a sound application of the psychology of "generalization." For example, this statement typifies the attitude of the author toward methods of teaching: "The teacher should constantly be aware that a general statement means nothing to anyone unless it serves to call up in his mind a large number of images and memories of particular, concrete facts that are included under it and that have been repeatedly associated with it and with one another."

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[1] G. R. Twiss, *Principles of Science Teaching*. New York: Macmillan, 1917. Pp. xxvi+486.

While the book cannot be said to include a detailed manual of method with its larger function of presenting the principles of science-teaching, yet it contains detailed illustrative lessons, verbatim accounts of "class conferences," "assignments," problems, laboratory exercises, etc. In his discussion of methods the Herbartian "five steps" are used as a guide for the discussion, but are made very real in the attempt to teach the proper steps in effective classroom work. The extent to which the author has psychologized the teaching of science is indicated again by the detailed and analytical discussion of aims and outcomes of instruction in science in chapter vi. In chapter vii we have the first sound attempt to apply the consensus of psychological judgment derived from experimentation on the transfer of training to sound practical directions for teaching pupils the ability to generalize. For example, we find this:

> 1. Training in one kind of activity may improve ability in other kinds of activity when the former has elements of content or elements of method in common with the latter.
>
> 2. Therefore the highest disciplinary value for general, non-technical education is to be found in the studies and activities that have the maximum of elements of content and elements of method that are common to the greatest number of essential or important life-activities, both individual and social.

The chapter throughout avoids controversial debate over the issue of general training and seeks to put in the hands of the teacher a tool which will enable him to make use in the field of science of that great opportunity for the generalization of experience in the solution of problems. Succeeding chapters of the book apply specifically the principles laid down in the first part to classroom and laboratory instruction, lecture demonstrations, and review lessons. A brief discussion is given of each of the sciences, a larger amount of space being devoted to physics and chemistry than to biology, geology, or general science. The book contains excellently organized bibliographies and detailed instructions concerning the selection and purchase of equipment, fulfilling in this way the function of a teaching manual. The last chapter presents briefly and very inadequately the problem of testing the results of instruction. To sum up the work, we have no hesitation in saying that no teacher of science should be without this new textbook.

B. A NEW BOOK SUMMARIZING EDUCATIONAL MEASUREMENTS

The measuring movement in education has developed a voluminous literature. Recently school men have felt the need for a systematic organization of the tests and scales which have come from the activity of the measures.

During the last year several rather complete annotated bibliographies have been published and two textbooks have come out. The editor has criticized the latter on the following counts: (1) they have not selected the best representative scales and standard tests to put before teachers; (2) they have included almost no evaluation of the tests; (3) they have not shown how they can be used to improve teaching in a definite way; and (4) they have not supplied school people with complete bibliographies of the tests and scales that are available. *Educational Tests and Measurements* by Monroe, De Voss, and Kelly[1] we recognize to be an improvement on the two previous textbooks. It is a brief textbook which aims to place in the hands of school teachers and administrative officers a summary of the tests and scales which have been published up to the present time in each of the elementary and high-school subjects of study. A brief chapter is given on the inaccuracy of present school marks to introduce the need for quantitative measurement in school practice. Following this the tests are presented in the next six chapters by subjects—arithmetic, reading, spelling, handwriting, language, and the high-school subjects.

The material is organized in each chapter under a fourfold scheme: (1) A brief discussion of the problem of testing abilities in the subject of study in question. This on the whole is very brief and hardly an adequate analytical treatment of that problem. (2) The presentation of each of the standardized tests and scales which has appeared for the measurement of abilities in that subject. It should be pointed out that no detailed principles are laid down for the critical evaluation of the scales in question. Neither do the authors make such critical evaluation, the presentation aiming to be informational only. This aim is carried out to the extent that a non-technical presentation is given of each of the tests. The authors do not reprint the scales and tests in full, but select typical portions to illustrate what has been done, referring the reader to the printed test or scale which he can secure if he desires. (3) Standard scores which have been set up as a result of the use of the tests and scales in each subject are summarized. This portion of the work places in the hands of the reader a fairly good summary, in condensed form, of the published standards. (4) A section is included in each chapter which discusses how to use the results of measurement. This cannot be said to be an intensive psychological discussion, but goes so far as to point out established "laws" of habit formation, memory, etc., with an elementary treatment of the application of these laws to instruction. The authors, however, make very little psychological analysis of the learning process in each of the different subjects. The book provides the reader with very complete bibliographies and on the whole will fill a need which has been experienced by school men recently for a fairly complete compilation of the tests which are now available.

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[1] W. S. Monroe, J. C. De Voss, and F. J. Kelly, *Educational Tests and Measurements*. Boston: Houghton Mifflin Co., 1917. Pp. xxii+309. $1.50.